

What is claimed is:

1 1. A method for signaling an event or control function in a multicarrier
2 communication system, the method comprising:

3 determining that there is an event or control function to signal;

4 encoding an active state signal point in a constellation associated with a
5 subchannel, the signal point being reserved for signaling purposes; and

6 transmitting the constellation to signal the event or control function during data
7 mode.

1 2. The method of claim 1 wherein at least a portion of the method is carried
2 out by software instructions executing on digital signal processor (DSP) technology.

1 3. The method of claim 1 wherein the multicarrier communication system is
2 a discrete multitone (DMT) system.

1 4. The method of claim 1 wherein the subchannel has a one bit capacity.

1 5. The method of claim 1 wherein the subchannel has a bit capacity of more
2 than one bit, and is assigned to a latency path that is subjected to error correction.

1 6. The method of claim 1 wherein the signal point reserved for signaling
2 purposes is established during an initialization procedure before entering the data mode.

1 7. The method of claim 1 wherein any non-signaling data pattern that is
2 randomly assigned to the signal point reserved for signaling purposes is forced on to a
3 pre-established replacement signal point.

1 8. The method of claim 7 wherein bit loading assignment and bit swapping
2 algorithms associated with the multicarrier communication system are programmed to

3 effect selective use of the signal point reserved for signaling purposes and the pre-
4 established replacement signal point.

1 9. The method of claim 7 wherein known errors generated by forcing data on
2 to the pre-established replacement signal point are corrected by error correction
3 techniques.

1 10. The method of claim 7 wherein the pre-established replacement signal is
2 established during an initialization procedure before entering the data mode.

1 11. The method of claim 1 wherein the step of encoding an active state signal
2 point includes changing the signal point from an inactive state to an active state.

1 12. The method of claim 1 wherein in response to determining that there is no
2 event or control function to signal, the signal point reserved for signaling purposes is
3 encoded to its inactive state.

1 13. The method of claim 1 wherein the signaled event or control function
2 takes effect after a predetermined turn around period.

1 14. A method for signaling an event or control function in a multicarrier
2 communication system, the method comprising:

3 determining that there is an event or control function to signal;
4 encoding a symbol associated with a first symbol data pattern with a data pattern
5 that is distinct from the first symbol data pattern and its inversion thereby
6 producing a distinct signaling symbol; and
7 transmitting the distinct signaling symbol to signal the event or control function
8 during data mode.

1 15. The method of claim 14 wherein at least a portion of the method is carried
2 out by software instructions executing on digital signal processor (DSP) technology.

1 16. The method of claim 14 wherein the multicarrier communication system is
2 a discrete multitone (DMT) system.

1 17. The method of claim 14 wherein the data pattern that is distinct from the
2 first symbol data pattern is associated with the event or control function before the
3 communication system enters the data mode.

1 18. The method of claim 14 wherein the symbol associated with the first
2 symbol data pattern is a sync symbol, and the first symbol data pattern is a sync symbol
3 data pattern.

1 19. The method of claim 14 wherein in response to determining that there is
2 no event or control function to signal, the method further comprises:
3 encoding the symbol associated with the first symbol data pattern with the first
4 symbol data pattern.

1 20. The method of claim 14 wherein the signaled event or control function
2 takes effect after a predetermined turn around period.

1 21. The method of claim 14 wherein the symbol associated with the first
2 symbol data pattern is transmitted once every superframe.

1 22. The method of claim 14 wherein the data pattern that is distinct from the
2 first symbol data pattern and its inversion is a shifted version of the first symbol data
3 pattern.

1 23. A method for signaling an event or control function in a multicarrier
2 communication system operating in data mode, the method comprising:
3 decoding received information and detecting a constellation signal point reserved
4 for signaling purposes in its active state; and

5 adjusting parameters of the system to effect the event or control function after a
6 pre-established turn around period.

1 24. The method of claim 23 wherein the multicarrier communication system is
2 a discrete multitone (DMT) system.

1 25. The method of claim 23 wherein the signal point reserved for signaling
2 purposes is associated with a subchannel having a one bit capacity.

1 26. The method of claim 23 wherein the signal point reserved for signaling
2 purposes is associated with a subchannel having a bit capacity of more than one bit, and
3 is assigned to a latency path that is subjected to error correction.

1 27. The method of claim 23 wherein the signal point reserved for signaling
2 purposes is established during an initialization procedure before entering the data mode.

1 28. The method of claim 23 further comprising:
2 correcting with forward error correction known errors generated by forcing non-
3 signaling data randomly assigned to the signal point reserved for signaling
4 purposes on to a pre-established replacement signal point.

1 29. The method of claim 28 wherein bit loading assignment and bit swapping
2 algorithms associated with the multicarrier communication system are programmed to
3 effect selective use of the signal point reserved for signaling purposes and the pre-
4 established replacement signal point.

1 30. The method of claim 28 wherein the pre-established replacement signal is
2 established during an initialization procedure before entering the data mode.

1 31. The method of claim 23 wherein the parameters include modem
2 configuration parameters associated with the event or control function being signaled.

1 32. A method for signaling an event or control function in a multicarrier
2 communication system operating in data mode, the method comprising:

3 decoding a distinct signaling symbol having a data pattern reserved for signaling
4 an event or control function; and

5 adjusting parameters of the system to effect the event or control function after a
6 pre-established turn around period.

1 33. The method of claim 32 wherein the multicarrier communication system is
2 a discrete multitone (DMT) system.

1 34. The method of claim 32 wherein the data pattern reserved for signaling the
2 event or control function is associated with the event or control function before the
3 communication system enters the data mode.

1 35. The method of claim 32 wherein the distinct signaling symbol is a sync
2 symbol which has had its sync symbol data pattern replaced by the data pattern reserved
3 for signaling the event or control function.

1 36. The method of claim 32 wherein the distinct signaling symbol is
2 transmitted once every superframe.

1 37. The method of claim 32 wherein the data pattern reserved for signaling the
2 event or control function is a shifted version of a sync symbol data pattern.

1 38. A modem adapted to signal an event or control function in a multicarrier
2 communication system during data mode, the modem comprising:

3 an encoder module adapted to encode an active state signal point in a
4 constellation associated with a subchannel, the signal point being reserved
5 for signaling purposes.

1 39. The modem of claim 38 wherein the signal point reserved for signaling
2 purposes is established during an initialization procedure before entering the data mode.

1 40. The modem of claim 38 wherein any non-signaling data pattern that is
2 randomly assigned to the signal point reserved for signaling purposes is forced on to a
3 pre-established replacement signal point.

1 41. The modem of claim 40 wherein bit loading assignment and bit swapping
2 algorithms associated with the multicarrier communication system are programmed to
3 effect selective use of the signal point reserved for signaling purposes and the pre-
4 established replacement signal point.

1 42. The modem of claim 40 wherein known errors generated by forcing data
2 on to the pre-established replacement signal point are corrected by error correction
3 techniques.

1 43. The modem of claim 40 wherein the pre-established replacement signal is
2 established during an initialization procedure before entering the data mode.

1 44. A modem adapted to signal an event or control function in a multicarrier
2 communication system during data mode, the modem comprising:

3 an encoder module adapted to encode a symbol associated with a first symbol
4 data pattern with a data pattern that is distinct from the first symbol data
5 pattern and its inversion thereby producing a distinct signaling symbol.

1 45. The modem of claim 44 wherein the data pattern that is distinct from the
2 first symbol data pattern is associated with the event or control function before the
3 communication system enters the data mode.

1 46. The modem of claim 44 wherein the symbol associated with the first
2 symbol data pattern is a sync symbol, and the first symbol data pattern is a sync symbol
3 data pattern.

1 47. The modem of claim 44 wherein the signaled event or control function
2 takes effect after a predetermined turn around period.

1 48. The modem of claim 44 wherein the symbol associated with the first
2 symbol data pattern is transmitted once every superframe.

1 49. The modem of claim 44 wherein the data pattern that is distinct from the
2 first symbol data pattern and its inversion is a shifted version of the first symbol data
3 pattern.

1 50. A modem adapted to signal an event or control function in a multicarrier
2 communication system during data mode, the modem comprising:

3 a decoder module adapted to decode received information and to detect a
4 constellation signal point reserved for signaling purposes in its active
5 state.

1 51. A modem adapted to signal an event or control function in a multicarrier
2 communication system during data mode, the modem comprising:

3 a decoder module adapted to decode a distinct signaling symbol having a data
4 pattern reserved for signaling an event or control function, wherein the
5 distinct signaling symbol is a symbol which has had its symbol data
6 pattern replaced by the data pattern reserved for signaling the event or
7 control function.

1 52. A method for performing initialization in a multicarrier communication
2 system including a transmitter-receiver pair, the method comprising:

3 determining the bit capacity of each subchannel included in the multicarrier
 4 system; and
 5 establishing, for the transmitter-receiver pair, a 1-bit subchannel as reserved for
 6 signaling a particular event or control function.

1 53. A method for performing initialization in a multicarrier communication
 2 system including a transmitter-receiver pair, the method comprising:

3 determining the bit capacity of each subchannel included in the multicarrier
 4 system; and
 5 establishing, for the transmitter-receiver pair, a constellation signal point as
 6 reserved for signaling a particular event or control function.